DOCUMENT RESUME

ED 238 587 PS 014 089

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TITLE Play-Language Relationships: Correspondence or Decalage?
PUB DATE Aug 83
NOTE 22p.; Paper presented at the Annual Meeting of the American Psychological Association (91st, Anaheim, CA, August 26-30, 1983).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Biological Influences; *Cognitive Development; Cognitive Processes; Cross Sectional Studies; *Infants; *Language Acquisition; Longitudinal Studies; Models; *Pretend Play; Social Influences; *Symbolic Learning
IDENTIFIERS Decalage; *Multidimensional Approach; Piagetian Theory

ABSTRACT

Despite considerable work concerning relationships between cognition and language in the second year of life, these relationships remain obscure. Clarification depends on resolution in at least three major areas. First, studies should be expanded beyond the scope of cognitive prerequisite models that have been difficult to conceptualize and that may prove too narrow to guide research. Second, in order to test models that go beyond correlation and evaluate structural correspondences across domains, researchers must be able to specify the sequence of development in both language and nonlanguage abilities and propose theoretically sound correspondences. Third, a realistic model for language acquisition must take account of other noncognitive, biological, and social variables influencing language, thus replacing simple cause-effect predictions with a more multidimensional model. The multidimensional model of language acquisition includes biological, experiential, and cognitive variables and their interactions. Recent longitudinal and cross-sectional studies offer evidence of the usefulness of the model. These studies, bearing on the development of combinational abilities in play and language, suggest ways the model might be employed. (RH)

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ED238587

Play-language relationships: Correspondence or decalage?[1]

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Paper presented at the American Psychological Association
Annual Meetings, Annaheim, CA - August 30, 1983

Contribution to the Symposium entitled

Cross-domain similarities in language and symbolic play, Larry Fenson, San Diego State University, Chair

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[1] An earlier version of this paper was presented to the New York Infancy Group, May 4, 1983. Preparation of this paper was partially supported by NICHD Grant No. HD 11731

Symbolic Play and Language: Correspondence or Decalage

Paper presented at the American Psychological Association, Fall, 1983

Loraine McCune-Nicolich

Relationships between symbolic play and language have previously been considered within the broader question concerning thought/language relationships and usually framed in terms of "cognitive pre-requisites" for language. While approaches to this issue during the early 1970's assumed that non-linguistic measures provided "purer" assessment of thought than linguistic measures, theoretical analyses (e.g., Bates, Benigni, Bretherton, Camaioni & Volterra, 1977) have suggested that linguistic and non-linguistic abilities proposed as reflecting the same underlying cognitive structure should be considered equal in sophistication, and hence potentially equivalent in onset time. Thus rather than considering certain cognitive milestones as "pre-requisite to" language milestones, one would attribute changes in both sets of abilities to a more abstract underlying base, and expect close correspondence in time of development, with neither skill necessarily preceding the other. Where a given order in timing of development is predicted, this should be based on particular sub-skills required for the execution of one skill, but not the other (Fischer, 1980).

Concerning language and symbolic play it is likely that more pre-requisite skills and experiences, beyond the shared cognitive base, would be required for language production than for play. The shared cognitive basis for developments in these two domains is their reflection of the ability to symbolize. Thus assessment of play can be used to judge the child's non-linguistic symbolic ability. What additional capabilities characterize language skill? A model of language acquisition is needed which will include a number of dimensions, each of which can be assessed separately to yield an overall prediction for the occurrence of language on set and various subsequent language transitions. Individual variation on such dimensions should also be useful in accounting for cases where

declage between developments in these domains is greater than the moderate level predicted by the shared structure of play and language skills. Theoretically, it should be possible to propose a model for the set of necessary pre-requisite skills and experiences which would lead to predictions across several months for particular language skills in individual cases. We are actually aided in this by the broad individual differences in the onset of language events which span the age range of ten and thirty months. Such prediction would be theoretically elegant, but would also be empirically useful, as many babies are now seen by speech/language pathologists as early as 24 months of age, and there is at present no clear manner to distinguish, for example, the two-year-old who will experience a spurt in the next six months from the one who is desperate for intervention of some sort.

In the present paper I will suggest an approach to the development of such a multi-dimensional model for language acquisition. In preparation for this the following sections (1) describe the model for symbolic development which provides the theoretical foundation for this approach and (2) review the correspondences between play and language milestones that I proposed previously (McCune-Nicolich, 1981).

Theoretical Background

While I posed my original question in Piagetian terms, as Bates and Snyder (1983) noted in a recent review, there is no Piagetian theory of language acquisition. However, a theory which I believe is harmonious with the cognitive-structuralist point of view has been specified by Werner and Kaplan (1963). In addition to an emphasis on cognitive structuring by the child, Werner and Kaplan emphasized the essential social basis of symbolization in addressor-addressee relationships. They described levels of increasing abstraction for symbols, but failed to articulate either cognitive or social processes to account for these developments.

Symbol defined. According to these authors the defining feature of a symbol is reference. With respect to the individual, they consider four components of symbolic reference: (1) the object "out there" (2) the internal analogue which represents the object, or the internal signified, (3) the internal analogue of the external expression (word or gesture) that is used to refer to the internal signified (i.e., the internal signifier), and (4) the external behavior, termed the "symbolic vehicle," which articulates this referent. This is diagrammed in figure 1. The arrows suggest that with development these components become more distant from one another, while becoming integrated in complex ways. Consideration of Piagetian type stage transitions as accounting for these developments would not be in conflict with the Werner and Kaplan perspective.

Insert Figure 1 here

The Primordial Sharing Relationship. Similarly, the Werner and Kaplan emphasis on the adult partner in representation is not in conflict with Piaget's views, particularly concerning decentration from the self and the importance of social transmission in cognitive development. As conceived by Werner and Kaplan, infant and adult care-giver share an initial relationship not unlike the positive symbiosis proposed by Mahler, Bergman, and Pine (1975). As the baby begins to be aware that there is an "other" and an object world, separate from the self, the baby initially assumes that the perspective and consciousness of the other are identical with those of the self. As diagrammed in Figure 2, with development there is gradual emergence from this view, and a concommitant desire to continue shared reference which now can be accomplished by various external strategies such as sharing objects, gesture, and eventually language.

Insert Figure 2 here

Rationale for play-language correspondences

In contrast with Werner and Kaplan, Piaget (1962) described symbolic development using play rather than language to exemplify successive developments. Furthermore, rather than proposing a continuous process, Piaget emphasized consolidation points in development, yielding a stage-like description of symbolic developments. In addition, the underlying equilibration process involving increasingly complex accommodations and assimilations was invoked by Piaget as the explanatory mechanism for these successive developments and less emphasis was placed on the mother-child relationship as the source of symbolic progress. Despite these differences, a fundamental similarity in the organizing activity attributed to the child and the structural descriptions of language (Werner and Kaplan 1963) and play (Piaget 1962) render these approaches complementary rather than conflictual. My (1981) predictions concerning play and language correspondences were based on theoretical analyses of these play and language skills, as well as on pilot observations.

On theoretical grounds, I consider the child's expression of pretend action, where the pretend act represents the underlying knowledge of the usual corresponding real-life activity, to be equivalent to use of a word to refer to internal knowledge of some entity existing in the object world. At this level, both the pretend action and the theoretically equivalent word make reference to a symbolized internal event or entity which is unanalyzed and global in nature. With development, objects and events are more fully analyzed so that in pretend the child differentiates actions from actors and is able to portray pretend actions using other actors than the self (e.g., feed doll, rather than feed self). In language, the child should reflect similar differentiation by linguistic reference to parts and attributes of objects in addition to continuing the more global event reference which characterized initial language. The effect of this development should be a sharp growth in vocabulary.

Once events can be analyzed into components, it is a reasonable step for the child to juxtapose pretend actions to form sequences and combine words to form verbal combinations. Eventually, the child becomes capable of constructing cognitive relationships between symbolic entities and thus exhibits planning in play and the regularities of syntactic structure in language. These hypothesized relationships are presented in Table 1.

Insert Table 1 here

A Multidimensional Approach to Language Acquisition

Thus far I have described the process of symbol formation in psychological terms following the ideas of Werner and Kaplan (1963) and presented a rationale for expected correspondences between developments in symbolic play and language. A predictive model for language acquisition will have to go well beyond theorizing of this sort. The play language correspondences can be considered a hypothesis subject to evaluation, the description of the social interactive process of symbolic development as a set of assumptions or a working definition which might also be subject to empirical validation at some point in time. For the moment, however, it is useful to assume a process of cognitive development involving active construction on the part of the child in a manner described by Piaget's theory and a process of symbolic development which encompasses both cognitive processes and social interaction as proposed by Werner and Kaplan. The model therefore includes assumptions concerning cognitive and social processes which would involve both internal consolidation and experience. In addition, biological developments would influence and interact with these dimensions. One can therefore consider biological developments experiential activities and cognitive construction as fundamental dimensions to be evaluated in understanding and eventually predicting essential aspects of language acquisition. The influence of these dimensions can be conceptualized as follows.

Biological. With respect to language, brain developments are needed which will allow at least the following functions: (1) representation as described in Figure 1, (2) articulation of vocal strings recognizable as words and sentences, and (3) maintaining a relationship between internal representations and external vocal expressions. This could involve significant discrete reorganizations with respect to each function at each language transition, single biological priming(s) allowing each function which may or may not occur together, or a process of relatively continuous biological change. Such reorganization(s) or their basic effects on brain function should be measurable in a manner independent of the linguistic and symbolic functions noted above.

Experiential. The experiential influence, can be considered as affecting expressive ability and cognitive construction opportunities in somewhat different but overlapping ways. Thus some articulation practice via babbling should influence vocal expressive ability. Social experiences involving separation/individuation, (Mahler, et al. 1975), motivation for interaction, and interaction strategies would influence social participation in language.

Experiences influencing cognitive construction are those which facilitate the cognitive aspects of representation. These can be considered as involving two types of experience: (1) play with objects in both a symbolic play fashion and in a logical or combinatorial manner (e.g., doing puzzles, grouping objects by kind, nesting cups; and (2) observation of and participation in events involving people which the child is able to internalize and use as a basis for cognitive consolidation of symbols and social events.

Cognitive Construction. Here I would invoke the Piagetian equilibration process, involving assimilation and accommodation leading to more advanced cognitive structures. The external manifestations of this internal process can be observed to a degree in the child's behavior. For example, the circular reactions of the first year have their analogue in the second: e.g., completing an activity with variations and repetitions. Similarly, the changing role of imitation in

language and play suggests such constructions. The cognitive constructive process, whatever its nature, is envisioned as the coordinating function which integrates experiential and biological aspects in a manner leading to qualitative change in language and symbolic function.

Interaction among the dimensions. In considering how these dimensions interact to effect development, assume that each of the four transitions in symbolic development noted in Table 1 has biological, experiential and cognitive (constructive) aspects. Cognitive construction can operate via experience only given certain biological readiness. For example, the onset of symbolic behavior at approximately 12 months of age theoretically involves the simultaneous observation of first words and first symbolic play acts. Twelve months is a mjaor change point for behaviors in a number of additional domains: entry into stage 6 object permanence, easily measureable attachment, stage 5 means-ends skills, establishment of a preferred hand for bi-manual tasks. Suppose, for a moment, that these changes are biologically driven in a necessary but not sufficient manner. It is unclear whether a single biological development in the brain potentiates all of these or whether separate biological contributions are needed for different skills. For example, one stream of biological development might lead to symbolization in action which would be sufficient for expression in symbolic play, object permanence and gesture. Another type of brain development might be needed for control of articulatory skills needed for word formation. Given relationships between hand preference, hemispheric specialization and language, transitions of some sort in hand use might rely on the same biological transition(s) as articulatory control (e.g., bimanual handedness and variegated syllable use, Ramsay, 1980.) Means-ends skills and attachment behaviors might be related to these biological changes but require different experiential components, the former, sufficient action on objects, the latter, sufficient social interaction.

It should be apparent that decalage in development could have its basis in (a) one or more differences in the biological basis of the two skills, and potential time lags between these developments, (b) differences in the experiential bases and the extent to which such experiences were available, and (c) time factors for cognitive construction to operate via appropriate experience after the appropriate biological readiness had been achieved. It is also theoretically plausible that cognitive construction based on experience is necessary to potentiate subsequent levels of biological transition, particularly where neural pathways are implicated.

Returning for a moment to the potential for decalage between onset of symbolic play and first words, the following sequences of events can be suggested. Suppose different biological transitions (usually closely linked in developmental onset) are required for symbolization onset and for control of the articulatory apparatus. Both transitions might occur early, appropriate experiences in all needed areas might be available, such that cognitive construction would operate in a relatively equivalent fashion, leading to correspondence in onset time of the two skills. Differences in timing of biological transition and/or experiential opportunities could lead to decalage. In an extreme case, several symbolic transitions might, over time, be potentiated at the biological level, while articulatory capability remained at a typical pre-twelve month level until many months later. In this case a child might show age-appropriate symbolic play, lack language and display abberrant or absent vocal development. However, on theoretical grounds, there would be nothing to prevent development of strong language comprehension skills leading to a sudden productive spurt when the missing biological transition(s) and sufficient vocal experience to be consolidated through cognitive construction were available. We occasionally hear reports of children who remain nonverbal until 24 months or even later, then begin speaking in full sentences. A combination of earlier biological development

allowing symbolization and hence constructive activity at the comprehension level, with delay in biological priming for articulation, would lead to such a pattern.

Strategies for Evaluating the Model

Ideally, given the assumptions of the present model, one would want to specify and measure relevant biological changes, make detailed prospective observations to determine whether and to what extent the appropriate experiences were available, then pinpoint the timing of transitions in the domains hypothesized as related. Lack of synchrony in timing could result because either biological transitions were more complex for one skill than the other (e.g., for speech, one needs articulatory control as well as representation, for symbolic play the latter will suffice) or some environmental anomaly (e.g., plenty of toy play leading to representation, but inconsistent caregiving leading to a lack of communicative skill with the available partners). For a child with some cognitive deficit, insufficient development of cognitive constructive processes as applied to one or another domain might also lead to delays.

Direct measurement of biological changes in the brain which affect development remain elusive. Therefore, strategies emphasizing behavioral measures provide the first steps for evaluating the proposed model. Such multivariate approaches as PATH analysis would be appropriate for large sample statistical evaluation of behavioral contributions of the model components. My own efforts to date have involved small longitudinal and moderate size cross-sectional samples so I have used a simpler if somewhat less conclusive approach.

Beginning with the behavioral expressions of symbolic skills, one can first examine the extent to which the proposed correspondences are supported. Given statistically reliable support for a correspondence, one can then compare discrepant cases where decalage between play and language is observed, to cases of cor-

respondence, to determine which of the other sources of variation hypothesized in the model might characterize such discrepant cases. Sources of variation differentiating these groups then receive indirect support as necessary but not sufficient contributors to the missing skill. As noted earlier, additional biologically primed skills are proposed for productive language, beyond those proposed for symbolic play. One would therefore expect that in longitudinal samples the play would be observed at the same time as or before the corresponding language milestone. In cross-sectional samples, one would expect cases of decalage favoring earlier onset of play to earlier onset of language.

Preliminary Data in Conformity With the Model

Recent longitudinal and cross-sectional studies offer evidence of the usefulness of this model. These studies, which bear on the developmnent of combinatorial abilities in play and language, are suggestive of how the model might be employed, rather than definitive in answering the question at hand.

Longitudinal Study.

Five girls were studied longitudinally from early in the single word period until their language was predominately combinatorial. Two transitions in play and language development were evaluated. First, all five subjects exhibited combinations in play either at the same time as or prior to using language combinations. Two children first exhibited play and language combinations in the same month, two with a lag between play and language of one and two months respectively, and the fifth child showed a single instance of play and language combinations at the first visit.

The second transition evaluated was that to rule-based combinations in language in relation to hierarchical combinations in play (Level 5). As reported in McCune-Nicolich and Bruskin (1981), following the children's development of Level 5 play, a number of related developmental shifts were observed in the

children's language. Within two months after this transition positional regularities (Braine, 1976) were first observed in their language combinations. This new combinatorial skill was also reflected in sharp increases in the number of different multiword utterances (types) used, and in mean length of utterance (MLU). In addition, general language capability was facilitated as reflected in large increases in frequency of speaking associated with onset of Level 5 play. (See Table 2.)

In relation to the multi-dimensional model for language described earlier it is of interest to consider the time lag from the play to the language transitions in relation to the children's age and prior language experience. Subjects 1 and 2, both 20 months old at the time of their Level 5 transition, had shown high frequencies of speech and some language combinations for two months prior to their Level 5 transition. These subjects exhibited positional patterns immediately, as well as showing the other quantitative language changes. Subjects 3 and 4, both 18 months old at the Level 5 transition, also both exhibited increases in frequency of speech at that time. However, subject 4, in contrast with subject 3 had been a high frequency speaker, and had begun exhibiting combinations several months earlier than subject 3. This prior experience with language may account for subject 4's immediate increase in MLU at Level 5 attainment, in comparison with subject 3's more gradual increase in MLU. Subject 5 was notable for a low frequency of both symbolic play and language behaviors in the course of the study. At 26 months of age when her Level 5 transition occurred, she had had many more months of opportunity for language experience (although she seldom spoke) and maturation than the other subjects. However, like subject 3, 8 months younger at the transition point, she exhibited immediate increases in frequency of speaking and number of word combinations, but only slow growth in MLU.

The reason for this pattern is unclear. This subject was less interactive with both mother and examiner than the other subjects, suggesting analysis of her social behavior as one approach to understanding this developmental pattern.

Cross Sectional Study

Subjects included in this study were 24 middle class children, evenly divided by sex, who ranged in age between 19 and 24 months. Symbolic play assessment was conducted in homes using materials and procedures described by McCune-Nicolich (Nicolich, 1977). A language sample was obtained from these free play sessions where each child interacted with the mother and a standard toy set. Assessment of mother-child interaction was conducted independently by a researcher who was unaware of the child's language or play status (Adler, 1982). Determination of the child's hand preference was obtained independently using procedures described by Ramsay (1980). Intelligibility was assessed based on the proportion of vocalizations in a given language sample which could be identified as words during the transcription process.

Results revealed that the play levels (1-5) formed an ordinal scale (coefficient of reproducibility and scalability both equal to 1.0), when the two lowest levels were pooled, as appeared necessary since some of the most advanced subjects failed to exhibit level 1. Results also supported the hypothesis of correspondence. Of the 24 subjects, one exhibited only single symbolic acts, 18 exhibited combinations (level 4), and 5 exhibited both combinations and the more advanced level of play (level 5) characterized by prior planning of play behaviors. The subject who showed no combinations in play also failed to combine words. Of 18 children who exhibited combinations in play, 12 showed corresponding combinations in language, while 6 exhibited a decalage between these symbolic domains, a Chi Square result significant at the .05 level.

As suggested by the multi-dimensional model for language acquisition, the 18 subjects who showed level 4 play combinations as their highest level of play were divided into correspondence (12) and decalage (6) groups and compared for intelligibility of speech, quality of mother-child interaction, and hand preference. Separate Fischer exact tests revealed that the decalage group was characterized by a significantly greater number of children exhibiting unintelligibility of speech and one or more extreme features of mother-child interaction than the correspondence group. There was no significant difference between the groups in presence or absence of a hand preference.

These results, although extremely difficult to interpret, show the complexity of the issues involved. The six children who showed combinations in play but not in language differed from the remaining subjects in both intelligibility of speech and a number of social measures, most consistently reflecting child behaviors. Thus four of these subjects showed low frequency of extending objects to their mothers, and a partially overlapping four were low in contingent responding to their mothers. Only one of twelve subjects in the correspondence group showed each of these characteristics. Three of the six decalage subjects' mothers showed two of the following maternal characteristics: mother directive rather than facilitative, mother shows more frequent bids than child, mother shows stronger bids than child. Only one subject in the correspondence group exhibited this pattern. Maternal directiveness, which has often been implicated as causal in slowing children's language development, could not have functioned in that manner here, because the five most directive mothers' children were distributed such that two were in the highest play/language group, one in the correspondence group, and two in the decalage group.

One could reason in several directions from these findings. Beginning with the children's low intelligibility, one might consider biologically-based poor articulatory control, hence low frequency of speaking. The more active mothers in

the group may be facilitating their children's development, such that without maternal leadership their responding would be even less frequent than their present low-contingent output. Alternatively (and not likely) their mothers' intrusiveness deprived the children of vocal practice and led them to try to escape interaction by failing to respond contingently. Other interpretations are certainly equally plausible. Only longitudinal study and more comprehensive measures applied at the case level to large numbers of cases will eventually allow prediction of language onset and transitions from other variables.

In summary, despite considerable work concerning cognition-language relationships in the second year of life, these relationships remain obscure, pending the resolution of at least three major issues. First, there has been an emphasis on cognitive pre-requisite models which have been difficult to conceptualize and may prove too narrow to guide research (Bates et al., 1977). Second, in order to test models which go beyond correlation and evaluate structural correspondences across domains, one must be able to specify the sequence of development in both language and non-language abilities, and propose theoretically sound correspondences (Fisher, 1980, McCune-Nicolich, 1981). Third, a realistic model for language acquisition must take account of other noncognitive variables influencing language, both of a biological and a social nature, thus, replacing simple cause-effect predictions with a more multi-dimensional model. The model and results presented here suggest one approach to understanding language development which goes beyond the concept of "cognitive pre-requisites." In attempting to consider cross-domain correspondences in behavior with underlying symbolic developments, as this model suggests, it is essential to consider additional threads of development which contribute to language development.

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Table 1

Sequences of Symbolic Development as expressed in play and language

Underlying development	Play	Language
Association of event with habitual action	(1) Recognition of objects	Pre-language communication
Representation of global event as a unit	(2) Self pretend	Single words, global reference
Analysis of represented object/event	(3) Differentiated pretend pretend with dolls pretend at others' activities	Reference to broader range of entities, to parts of entities, to states
Juxtaposition of symbolic elements	(4) Pretend combinations	Simple language combinations
Construction of relations among symbolic elements Store complete event while parts are organized	(5) Planning Store symbolic goal while intervening steps are accomplished Keep dual meaning of substitute object (e.g., block = doll) while performing doll-appropriate activities	Developing language rules Store complete message while component parts are organized

Table 2[1]

Language Changes Associated with Level 5 Play Onset[1]

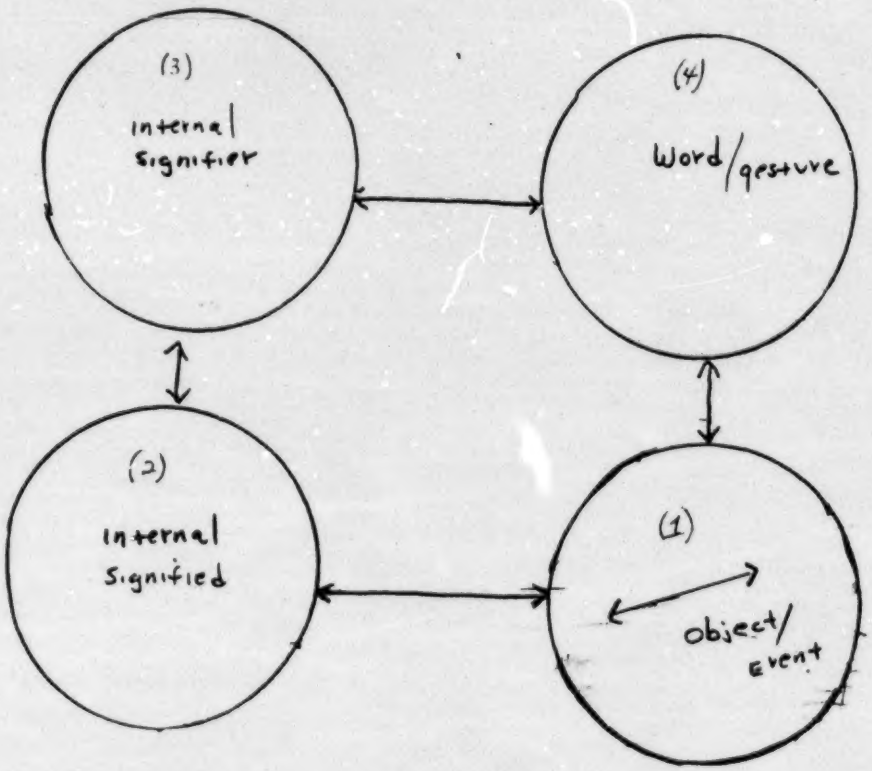
Months from onset	MLU					Total Utterances					Total Multiword Types				
	S1	S2	S3	S4	S5	S1	S2	S3	S4	S5	S1	S2	S3	S4	S5
-3	1.13	1.02	1.0	1.06	1.04	88	120	10	114	74	7	1	0	1	3
-2	1.14	1.07	1.0	1.0	1.11	92	83	71	108	89	5	5	0	4	7
-1	1.19	1.03	1.05	1.09	1.14	93	171	146	333	50	5	3	4	0	5
Onset	1.47	1.17	1.07	1.49	1.19	424	296	417	390	301	103	29	13	18	36
+1	1.89	1.54	1.03	1.72	1.31	317	372	149	439	218	111	97	3	95	38
+2	-	-	1.15	1.74	1.31	-	-	310	460	318	-	-	30	109	67
+3	-	-	1.62	1.84	-	-	-	384	384	-	-	-	104	120	-

Ages at onset of Level 5 play were as follows: S1-21.2 months, S2-19.3 months, S3-18 months, S4-18 months, S5-26 months

[1] This table is adopted from McCune-Nicolich and Bruskin (1981).

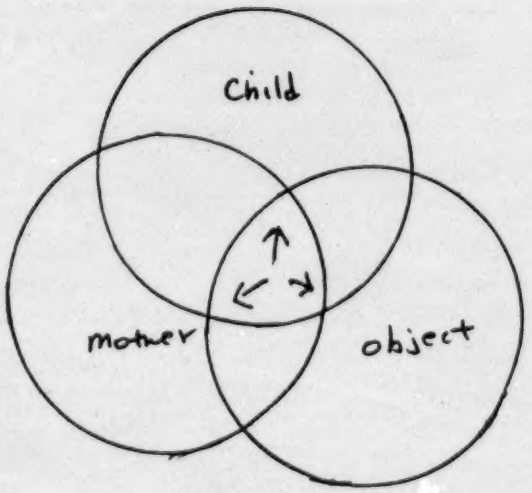
Symbolic and Social aspects of distancing

Figure I



Arrows indicate increased distancing with development

Figure II



adapted from Werner & Kaplan Symbol formation 1963 Wiley